WHAT IS CLAIMED IS:

1. An optical bar-code reader comprising:

an optical scanner that optically scans a bar code to obtain optical power of light reflected from white bars and black bars of the bar code;

a differentiation unit that calculates a differential of the optical power to obtain a differential waveform;

a dividing unit that divides the differential waveform into a positive waveform and a negative waveform;

a bar-code correcting unit that calculates correct widths of black bars in the bar code from the positive waveform and the negative waveform to create corrected bar-code data; and

a converter that converts the corrected bar-code data into character data that is an array of numerals and alphabets.

2. The bar-code reader according to claim 1, wherein the bar-code correcting unit further comprises:

an acquisition unit that acquires amplitude information of the positive waveform using a timing signal corresponding to the positive waveform and amplitude information of the negative waveform using a timing signal corresponding to the negative waveform; and

a synthesizing unit that synthesizes the amplitude information of the positive waveform and the amplitude information of the negative waveform to create the corrected bar-code data.

3. The bar-code reader according to claim 1, wherein the bar-code correcting unit further comprises:

an acquisition unit that acquires amplitude information of the positive waveform by generating a timing signal corresponding to the positive waveform, and amplitude information of the negative waveform using a timing signal in which the timing signal corresponding to the positive waveform is delayed by a predetermined amount; and

a synthesizing unit that synthesizes the amplitude information of the positive waveform and the amplitude information of the negative waveform to create the corrected bar-code data.

4. The bar-code reader according to claim 1, wherein the bar-code correcting unit further comprises:

a waveform-generating unit that generates a synthesized waveform by synthesizing the positive waveform with the negative waveform that is delayed by a predetermined amount; and

an acquisition unit that acquires amplitude information from the synthesized waveform using a predetermined timing signal and uses the amplitude information acquired as the corrected bar-code data.

5. The bar-code reader according to claim 3, wherein the acquisition unit calculates the amount of delay from a correlation between the positive waveform and the negative waveform.

6. The bar-code reader according to claim 4, wherein the

waveform-generating unit calculates the amount of delay from a correlation between the positive waveform and the negative waveform.

7. The bar-code reader according to claim 5, wherein the acquisition unit calculates the correlation by performing a fast Fourier transformation of each of the positive waveform and the negative waveform.

8. The bar-code reader according to claim 6, wherein the waveform-generating unit calculates the correlation by performing a fast Fourier transformation of each of the positive waveform and the negative waveform.

9. The bar-code reader according to claim 3, wherein the acquisition unit calculates the amount of delay from a ratio of a width of the black bar or a width of the white bar and a basic width of the bar code.

10. The bar-code reader according to claim 4, wherein the waveform-generating unit calculates the amount of delay from a ratio of a width of the black bar or a width of the white bar and a basic width of the bar code.

11. The bar-code reader according to claim 2, wherein, the synthesizing unit controls a phase during synthesis of the amplitude

information of the positive waveform and the amplitude information of the negative waveform such that a total of absolute value of each amplitude included in a result of synthesis becomes maximum.

12. The bar-code reader according to claim 3, wherein, the synthesizing unit controls a phase during synthesis of the amplitude information of the positive waveform and the amplitude information of the negative waveform such that a total of absolute value of each amplitude included in a result of synthesis becomes maximum.

13. The bar-code reader according to claim 1, further comprising a basic-width calculating unit that calculates the basic width of the bar code from either the positive waveform or the negative waveform.

14. A method of reading a bar code comprising:

optically scanning a bar code to obtain optical power of light reflected from white bars and black bars of the bar code;

calculating a differential of the optical power to obtain a differential waveform;

dividing the differential waveform into a positive waveform and a negative waveform;

calculating correct widths of black bars in the bar code from the positive waveform and the negative waveform and creating corrected bar-code data; and

converting the corrected bar-code data into character data that

is an array of numerals and alphabets.

15. The method according to claim 14, wherein the computing further includes:

acquiring amplitude information of the positive waveform using a timing signal corresponding to the positive waveform and amplitude information of the negative waveform using a timing signal corresponding to the negative waveform; and

synthesizing the amplitude information of the positive waveform and the amplitude information of the negative waveform to create the corrected bar-code data.

16. The method according to claim 14, wherein the computing further includes:

acquiring amplitude information of the positive waveform by generating a timing signal corresponding to the positive waveform, amplitude information of the negative waveform using a timing signal in which the timing signal corresponding to the positive waveform is delayed by a predetermined amount; and

synthesizing the amplitude information of the positive waveform and the amplitude information of the negative waveform to create the corrected bar-code data.

17. The method according to claim 16, wherein the computing further includes:

generating a synthesized waveform by synthesizing the positive waveform with the negative waveform that is delayed by a predetermined amount; and

acquiring amplitude information using a predetermined timing signal from the synthesized waveform and using the amplitude information acquired as the corrected bar-code data.

18. A computer program that makes a computer execute:

optically scanning a bar code to obtain optical power of light reflected from white and black bars of the bar code;

calculating a differential of the optical power to obtain a differential waveform;

dividing the differential waveform into a positive waveform and a negative waveform;

calculating correct widths of black bars in the bar code from the positive waveform and the negative waveform and creating corrected bar-code data; and

converting the corrected bar-code data into character data that is an array of numerals and alphabets.